



west virginia department of environmental protection

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ENGINEERING EVALUATION / FACT SHEET

BACKGROUND INFORMATION

Application No.:	R13-2873
Plant ID No.:	081-00246
Applicant:	Mine Power Systems, Inc.
Facility Name:	Beaver Facility
Location:	Beaver, WV; Raleigh County
NAICS Code:	213113
Application Type:	Construction
Received Date:	February 28, 2011
Engineer Assigned:	Laura Jennings
Fee Amount:	\$1,000
Date Received:	March 4, 2011
Complete Date:	March 28, 2011
Due Date:	June 26, 2011
Applicant Ad Date:	March 8, 2011
Newspaper:	<i>Beckley Newspapers</i>
UTM's:	Easting: 489.782 km Northing: 4183.334 km Zone: 17
Description:	After the fact permitting for battery and charger rebuild and repair shop. The proposed change happened March 20, 2009.

DESCRIPTION OF PROCESS

Batteries:

Batteries enter the facility on trucks. A forklift is used to unload them and they are taken to an evaluation area, where they are charged for 8-24 hours and then discharged while measurements are taken to see which cells may be salvaged. After testing, the battery is disassembled. Its connectors are drilled off and recycled. Its cells are then removed. Once the tray has been emptied of its cells, it is placed in the natural gas fired burn-off oven so that its Plastisol and paint coating may be removed. The tray is baked at 875 degrees for two to three hours. The maximum amount of process material charged is 15 tons of battery trays. The heat pulverizes the trays coatings, and once the tray has cooled, the ash is vacuumed out. The tray then gets sandblasted with Black Beauty granular product. It then goes to the welding room for repairs, if necessary. The tray is then taken to the paint room, where a Plastisol primer is applied. It is then taken to the Plastisol room,

where Plastisol is applied. Then the tray is baked at 350 degrees for two hours in the bake oven so that the Plastisol may cure. The maximum amount of material processed per hour is 15 tons of battery trays. Once the cells are stowed, the battery is taken to the connection area, where its connectors are burned on and the cells connected in series. The battery is then taped off, and taken to the paint room for painting. It is then taken for decals and numbering, and finally goes to the washroom, where it is given a final cleaning using only recycled water. It is then loaded on a truck and leaves the facility for delivery.

Chargers:

Used charges enter the facility on trucks, are unloaded with forklifts and disassembled in a work area of the charger shop. Charger cases still good enough to use are taken for sandblasting and painting before being returned to charger shop for reassembly. If the charger case is not good enough for reuse, a new charger case is brought to the shop from the charger warehouse on the other side of the building. Primarily, our shop is an assembly facility. We manufacture our own transformers, which are wound by hand and then dipped in polyester resin and cured in an oven for three hours at 320 degrees. The maximum amount of transformers processed through the VPI[4S] or Dip tank [5s] is 0.45 tons per hour. Once the transformers are made, they are wired in a charger case with other components - a controller, capacitors, rectifier, etc. and tested for quality control. They are then placed on trucks for delivery.

Emissions Unit Table:

Emission Unit ID	Emission Point ID	Emission Unit Description	Year Installed / Modified	Design Capacity	Type and Date of Change	Control Device
1S	1E	Burn-off oven (Steelman; Model 1257 BA-P, Natural Gas)	2010	Oven primary 0.51 MMBtu/hr; Afterburner 0.71 MMBtu/hr	After-the-fact	n/a
2S	2E	Bake Oven (Steelman Series 146 Natural Gas)	2000	0.4 MMBtu/hr	After-the-fact	n/a
3S	3E	Paint Booth	1997	15 tons/hour	After-the-fact	1C
4S	4E	VPI	1999	0.45 tons/hour	After-the-fact	n/a
5S	5E	Dip Tank	1999	0.45 tons/hour	After-the-fact	n/a
6S	6E	Abrasive Blast Cabinet	1999	10 lbs/hour	After-the-fact	2C
7S	7E	Black Beauty Blast Room	1997	15 tons/hour	After-the-fact	n/a

Control Device ID	Control Device Description	Minimum Collection efficiency
1C	Filter Services, Inc. - Green White Fiberglass	98.8%
2C	Trinco Trinity Tool Company - Fabric Filter Bag	98%

Materials reviewed:

C1445
707C Insulating Varnish (Diptank & VPI)
FSC16022 FSC Alkyd Fast Dry Porcelain White
FSC16085 FSC Alkyd Fast Dry Gloss Black
Xylene
White PVC Spray - plastisol

SITE INSPECTION

On May 10, 2011 the writer conducted a site inspection as part of this engineering evaluation. Representatives from MPS were Matthew Bickey, VP of Operations and Dale Mayes, Plant Manager.

The facility tour included the battery process and the charger process including the manufactured transformers. The burn-off oven with afterburner was programmed by the manufacturer to control the temperature and duration until the combustible materials decompose. The oven is used to remove plastic residue from processing equipment so that the equipment can be re-used. Ash is removed from the oven.

The bake oven that is used to cure the PVC plastisol in the battery cells was also programmed by the manufacturer. The application of the plastisol helps extend the battery cell life used to power equipment in the mines by providing insulation to the steel cases from the battery acid. The room where the plastisol is applied does not have an outside exhaust.

The filters used in the paint room to control emissions prior to being exhausted are changed every 2 months, unless it is needed sooner. MPS has a contract with an outside vendor to perform this service.

The particulate from the black beauty blast room is controlled with a fully enclosed exhaust vent that is a closed loop back into the black beauty storage shed.

It should be noted that there is a resin curing oven that is used to cure resins that are applied either in the VPI system or the dip tank. This is an electric oven and therefore is not listed in the equipment unit table.

ESTIMATE OF EMISSIONS BY REVIEWING ENGINEER

Air Quality Emissions Estimates for Mine Power Systems (MPS) were calculated by Gene Coccari, Environmental Resource Analyst with the DAQ Small Business Assistance Program based on information provided by MPS.

Annual potential to emit calculations are based on operating 8760 hours per year. Hourly potential emissions for the coatings are spiked to represent the most coating that could possibly be sprayed in an hour.

Hazardous Air Pollutants (HAPs) were calculated based on the maximum percentage of HAP present in the appropriate coating emission based on the composition provided in the MSDS. The total HAP emissions are the highest emissions from all of the individual hazardous air pollutants.

The burnout and bake oven emissions are based on information provided by the manufacturer, Steelman Industries, Inc.

Abrasive blasting emissions are based on AP-42 factors, Chapter 13.2.6.

The potential emissions are provided in the table below:

Emission Pt ID	Emission Unit ID	Control Device	Regulated Pollutant	Maximum Potential Uncontrolled Emissions		Maximum Potential Controlled Emissions	
				lb/hr	tpy	lb/hr	tpy
1E	1S Burn-off oven	n/a	PM30	0.03	0.12	0.03	0.12
			PM10	0.02	0.06	0.02	0.06
			CO	0.02	0.07	0.02	0.07
			SO2	0.02	0.07	0.02	0.07
			VOCs	0.03	0.12	0.03	0.12
			NOx	0.14	0.60	0.14	0.60
2E	2S Bake-off oven	n/a	PM30	0.03	0.12	0.03	0.12
			PM10	0.02	0.06	0.02	0.06
			CO	0.10	0.22	0.10	0.22
			SO2	0.02	0.07	0.02	0.07
			VOCs	0.03	0.12	0.03	0.12
			NOx	0.05	0.44	0.05	0.44

3E	3S Paint Booth	1C Filter	PM30	13.0	2.04	1.30	0.21
			PM10	6.2	0.97	0.62	0.10
			VOCs	15.0	8.30	15.0	8.30
			Total HAPs	33.0	6.84	33	6.82
			Xylene	22.0	4.30	22.0	4.30
			Ethyl Benzene	4.5	0.93	4.5	0.93
			Toluene	2.0	1.23	2.0	1.23
			Glycol Ethers	5.0	0.37	5.0	0.37
			Lead Compounds	33.0	0.03	33.0	0.01
			Cobalt Compounds	15.0	0.01	15.0	0.01
4E	4S VPI	n/a	VOC	3.04	3.16	3.04	3.16
5E	5S Dip Tank	n/a	VOC	3.04	3.16	3.04	3.16
6E	6S Abrasive Blast Cabinet	2C Filter Bag	PM30	0.04	0.04	0.01	0.01
			PM10	0.02	0.02	0.01	0.01
7E	7S Black Beaut Blast Room	N/a	PM30	27	2.60	27	2.60
			PM10	12.9	1.24	12.9	1.24
TOTAL			PM30	40.1	4.92	28.37	3.06
			PM10	19.16	2.35	13.57	1.47
			CO	0.12	0.29	0.12	0.29
			SO2	0.04	0.14	0.04	0.14
			VOCs	21.12	14.84	21.12	14.84
			NOx	0.19	1.04	0.19	1.04
			Total HAPs	33.0	6.84	33	6.82

REGULATORY APPLICABILITY

STATE REGULATIONS

45CSR6 TO PREVENT AND CONTROL AIR POLLUTION FROM COMBUSTION OF REFUSE

The purpose of this rule is to prevent and control air pollution from combustion of refuse. "Refuse" means the useless and/or unwanted or discarded solid, liquid and/or gaseous waste materials resulting from community, commercial, industrial, or citizen activities.

Mine Power Systems is subject to this rule because the Burn Out Oven [1S] meets the definition of an "incinerator". "Incinerator" means any device used to accomplish incineration. "Incineration" means the destruction of combustible refuse by burning in a furnace designed for that purpose.

Section 4.1 limits the allowable particulate matter to be discharged from the incinerator into the open air, determined by the formula:

$$\text{Emissions (lb/hr)} = F \times \text{Incinerator Capacity (tons/hr)}$$

The maximum amount of battery trays to be charged per hour in the burnout oven [1S] is 15 tons. Using the above calculation and an F Factor of 2.72 taken from Table I of 4.1, the particulate matter emissions limit is 40.8 lb/hr. MPS maximum PTE for PM30 is 0.03 and will therefore be in compliance with this requirement.

The facility is not subject to section 4.2 because it is located in Raleigh County. The facility will demonstrate compliance with sections 4.3 - 4.6 by meeting the conditions of the permit.

45CSR7 TO PREVENT AND CONTROL PARTICULATE MATTER AIR POLLUTION FROM MANUFACTURING PROCESSES AND ASSOCIATED OPERATIONS

The facility has the potential to emit particulate matter during routine process operations and therefore 45CSR7 is applicable to the facility. Section 3.1.1. limits the emission of smoke and/or particulate matter into the open air from any process source operation which is greater than twenty (20) percent opacity. Section 4.1.1. limits the particulate matter emissions in Table 45-7A by source operations type. The proposed facility is a type 'a' emission source defined by 45CSR7-2.39.

The amount of proposed process material coated per hour in the paint

booth [3S] is 30,000 pounds per hour as listed in the emission unit data sheets. The maximum emission rate specified in Table 45-7a is 22 lbs/hr. The controlled total particulate matter emissions from the Spray Paint Booth [3E] is 1.30 lbs/hr which is below the limit, indicating compliance.

The amount of proposed process material transferred per hour through the bake oven [2S] is 30,000 pounds per hour as listed in the emission unit data sheet. The maximum emission rate specified in Table 45-7a is 22 lbs/hr. The controlled total particulate matter emissions from the bake oven [2E] is 0.03 lbs/hr which is below the limit, indicating compliance.

The amount of proposed process material transferred per hour through the burn-off oven [1E] is 30,000 pounds per hour as listed in the emission unit data sheet. The maximum emission rate specified in Table 45-7a is 22 lbs/hr. The controlled total particulate matter emissions from the burn-off oven [1E] is 0.03 lbs/hr which is below the limit, indicating compliance.

The amount of proposed process material charged per hour in the Abrasive Blast Cabinet [6E] is 10 pounds per hour as listed in the emission unit data sheet. The maximum emission rate specified in Table 45-7a is 0.1 lbs/hr. The controlled total particulate matter emissions from the Abrasive Blast Cabinet are 0.01 lbs/hr and is below this limit, indicating compliance.

The amount of proposed process material charged per hour in the Black Beauty Sandblast Room [7E] is 30,000 pounds per hour as listed in the emission unit data sheet. The maximum emission rate specified in Table 45-7a is 22 lbs/hr. The controlled total particulate matter emissions from the Black Beauty Sandblast Room are 27 lbs/hr and is above the limit. The emission limit in the permit will be the 45CSR7 limit of 22 lbs/hr. MPS will demonstrate compliance to this requirement by demonstrating compliance with the permit limit.

Section 5.1 requires a system to minimize the emissions of the fugitive particulate matter. The burn-off oven is fired by natural gas and has an afterburner in addition to the primary oven. Ash from the burn-out oven is vacuumed out of the oven. The Paint Booth uses fiberglass filters that have a guaranteed minimum collection efficiency of 98.8%. The Abrasive Blast Cabinet is enclosed and uses fabric filter bags with a guaranteed minimum collection efficiency of 98%. The controls described demonstrate compliance with this requirement.

45CSR13 PERMITS FOR CONSTRUCTION, MODIFICATION, RELOCATION AND OPERATION OF STATIONARY SOURCES OF AIR POLLUTANTS, NOTIFICATION REQUIREMENTS, ADMINISTRATIVE UPDATES, TEMPORARY PERMITS, GENERAL PERMITS, PERMISSION TO COMMENCE CONSTRUCTION, AND PROCEDURES FOR EVALUATION

The facility is subject to 45CSR13 because it meets the definition of a stationary source. The facility is subject to a substantive requirement of an emission control rule promulgated by the Secretary (45CSR6), it has the potential to discharge more than 6 pph and 10 tpy of any regulated air pollutant, and it has the potential to discharge more than 2 pph and 5 tpy of hazardous air pollutants considered on an aggregated basis.

The maximum potential of lead compound emissions are less than 1,200 pounds per year allowed in Table 45-13A.

45CSR16 STANDARDS OF PERFORMANCE FOR NEW STATIONARY SOURCES PURSUANT TO 40 CFR PART 60

The facility is not subject to 45CSR16 because it is not subject to any Subpart of 40 CFR 60. See federal section below for details of this review.

45CSR21 REGULATION TO PREVENT AND CONTROL AIR POLLUTION FROM THE EMISSION OF VOLATILE ORGANIC COMPOUNDS

This regulation applies to sources located in Putnam, Kanawha, Cabell, Wayne, and Wood Counties.

The facility is not subject to 45CSR21 because it is located in located in Raleigh County.

45CSR27 TO PREVENT AND CONTROL THE EMISSIONS OF TOXIC AIR POLLUTANTS

MPS uses White PVC Spray as a Plastisol that contains Lead Compounds at 1.86 weight percent according to the material safety data sheet. Emissions for Lead Compounds were calculated using the weight percentage from the MSDS multiplied by the potential particulate matter emissions of the Plastisol White PVC Spray. This calculation results in 0.027 tons per year or 53.2 pounds per year which is below the 1,200 pound per year limit provided in Table 13-A of 45CSR13. Although Lead Compounds are listed as a Hazardous Air Pollutant in Table 13-A,

it does not have a limit under 45CSR27 and is not defined as a Toxic Air Pollutant under 45CSR27 and the regulation therefore does not apply.

45CSR29 RULE REQUIRING THE SUBMISSION OF EMISSION STATEMENTS FOR VOLATILE ORGANIC COMPOUND EMISSIONS AND OXIDES OF NITROGEN EMISSIONS

This rule requires the submission of an emission statement from owners and operators of stationary sources emitting volatile organic compounds (VOCs) or oxides of nitrogen (Nox). This rule applies to sources located in Putnam, Kanawha, Cabell, Wayne, Wood, and Greenbrier Counties.

The facility is not subject to 45CSR29 because it meets the exception requirements of 45CSR29-3.2 because it emits less than 25 tons per year of plant-wide actual VOC emissions and are included in the Director's base-year and periodic emissions inventories. When the permit is issued for new facilities, the paperwork is submitted to add them to the database.

45CSR30 REQUIREMENTS FOR OPERATING PERMITS

The facility does not meet the definition of a major source as defined in 45CSR30-2.26

FEDERAL REGULATIONS

40 CFR PART 60 STANDARDS OF PERFORMANCE FOR NEW STATIONARY SOURCES

SUBPART E STANDARDS OF PERFORMANCE FOR INCINERATORS

The facility is not subject to this subpart because the daily charging rate of the incinerator is less than 50 tons/day.

SUBPART TT STANDARDS OF PERFORMANCE FOR METAL COIL SURFACE COATING

Mine Protective Services manufactures their own transformers which are wound by hand and then dipped in polyester resin and cured. EPA makes a distinction for magnet wire coatings and metal coils. Based on the definitions below taken from 40 CFR63 Subpart MMMM and Subpart SSSS respectively, MPS is not subject to NSPS, Subpart TT because they coat magnet wire and not metal coils. There is not an NSPS Subpart for

the Surface Coating of Miscellaneous Metal Parts and Products.

Magnet wire coatings are applied to a continuous strand of wire which will be used to make turns (windings) in electrical devices, such as coils, transformers, or motors. *Metal coils* are a continuous metal strip that is at least 0.15 mm thick, which is packaged in a roll or coil prior to coating.

40 CFR PART 63 NATIONAL EMISSION STANDARDS FOR HAZARDOUS AIR POLLUTANTS FOR SOURCE CATEGORIES

SUBPART HHHHHH PAINT STRIPPING AND MISCELLANEOUS SURFACE COATING OPERATIONS AT AREA SOURCES

The state of West Virginia has not taken delegation of Area Source toxics standards. As such, Mine Power Systems facility has not been reviewed against Subpart HHHHHH requirements.

TOXICITY OF NON-CRITERIA REGULATED POLLUTANTS

Toluene:

The acute toxicity of toluene is low. Toluene may cause eye, skin, and respiratory tract irritation. Short-term exposure to high concentrations of toluene (e.g., 600 ppm) may produce fatigue, dizziness, headaches, loss of coordination, nausea, and stupor; 10,000 ppm may cause death from respiratory failure. Ingestion of toluene may cause nausea and vomiting and central nervous system depression. Contact of liquid toluene with the eyes causes temporary irritation. Toluene is a skin irritant and may cause redness and pain when trapped beneath clothing or shoes; prolonged or repeated contact with toluene may result in dry and cracked skin. Because of its odor and irritant effects, toluene is regarded as having good warning properties. The chronic effects of exposure to toluene are much less severe than those of benzene. No carcinogenic effects were reported in animal studies. Equivocal results were obtained in studies to determine developmental effects in animals. Toluene was not observed to be mutagenic in standard studies. The major use of toluene is as a mixture added to gasoline to improve octane ratings. Toluene is also used to produce benzene and as a solvent in paints, coatings, synthetic fragrances, adhesives, inks, and cleaning agents. Toluene is also used in the production of polymers used to make nylon, plastic soda bottles, and polyurethanes and for pharmaceuticals, dyes, cosmetic nail products, and the synthesis of organic chemicals.

Glycol Ethers:

Glycol ethers have many uses; these include use as solvents and as an ingredient in cleaning compounds, liquid soaps, and cosmetics. Acute (short-term) exposure to high

levels of the glycol ethers in humans results in narcosis, pulmonary edema, and severe liver and kidney damage. Chronic (long-term) exposure to the glycol ethers in humans may result in neurological and blood effects, including fatigue, nausea, tremor, and anemia. No information is available on the reproductive, developmental, or carcinogenic effects of the glycol ethers in humans. Animal studies have reported reproductive and developmental effects from inhalation and oral exposure to the glycol ethers. EPA has not classified the glycol ethers for carcinogenicity. The glycol ethers are used as solvents for resins, lacquers, paints, varnishes, gum, perfume, dyes, inks, as a constituent of paints and pastes, cleaning compounds, liquid soaps, cosmetics, and hydraulic fluids. 2-Butoxyethanol is used in the production of cleaning agents and as a general solvent.

Xylenes:

Commercial or mixed xylene usually contains about 40-65% *m*-xylene and up to 20% each of *o*-xylene and *p*-xylene and ethyl benzene. Xylenes are released into the atmosphere as fugitive emissions from industrial sources, from auto exhaust, and through volatilization from their use as solvents. Acute (short-term) inhalation exposure to mixed xylenes in humans results in irritation of the eyes, nose, and throat, gastrointestinal effects, eye irritation, and neurological effects. Chronic (long-term) inhalation exposure of humans to mixed xylenes results primarily in central nervous system (CNS) effects, such as headache, dizziness, fatigue, tremors, and incoordination; respiratory, cardiovascular, and kidney effects have also been reported. EPA has classified mixed xylenes as a Group D, not classifiable as to human carcinogenicity. Mixed xylenes are used in the production of ethylbenzene, as solvents in products such as paints and coatings, and are blended into gasoline.

Ethyl Benzene:

Ethyl benzene is mainly used in the manufacturing of styrene. Acute (short-term) exposure to ethyl benzene in humans results in respiratory effects, such as throat irritation and chest constriction, irritation of the eyes, and neurological effects, such as dizziness. Chronic (long-term) exposure to ethyl benzene by inhalation in humans has shown conflicting results regarding its effects on the blood. Animal studies have reported effects on the blood, liver, and kidneys from chronic inhalation exposure to ethyl benzene. Limited information is available on the carcinogenic effects of ethyl benzene in humans. In a study by the National Toxicology Program (NTP), exposure to ethyl benzene by inhalation resulted in an increased incidence of kidney and testicular tumors in rats, and lung and liver tumors in mice. EPA has classified ethyl benzene as a Group D, not classifiable as to human carcinogenicity.

Cobalt Compound:

Cobalt is a natural element found throughout the environment. Acute (short-term) exposure to high levels of cobalt by inhalation in humans and animals results in respiratory effects, such as a significant decrease in ventilatory function, congestion, edema, and hemorrhage of the lung. Respiratory effects are also the major effects noted from chronic (long-term) exposure to cobalt by inhalation, with respiratory irritation, wheezing, asthma, pneumonia, and fibrosis noted. Cardiac effects, congestion of the liver, kidneys, and conjunctiva, and immunological effects have also

been noted in chronically-exposed humans. Cobalt is an essential element in humans, as a constituent of vitamin B12. Human studies are inconclusive regarding inhalation exposure to cobalt and cancer, and the one available oral study did not report a correlation between cobalt in the drinking water and cancer deaths. EPA has not classified cobalt for carcinogenicity. Cobalt is used to make superalloys (alloys that maintain their strength at high temperatures approaching their melting points) and in pigment manufacture.

Lead Compounds:

Lead is used in the manufacture of batteries, metal products, paints, and ceramic glazes. Exposure to lead can occur from breathing contaminated workplace air or house dust or eating lead-based paint chips or contaminated dirt. Lead is a very toxic element, causing a variety of effects at low dose levels. Brain damage, kidney damage, and gastrointestinal distress are seen from acute (short-term) exposure to high levels of lead in humans. Chronic (long-term) exposure to lead in humans results in effects on the blood, central nervous system (CNS), blood pressure, kidneys, and Vitamin D metabolism. Children are particularly sensitive to the chronic effects of lead, with slowed cognitive development, reduced growth and other effects reported. Reproductive effects, such as decreased sperm count in men and spontaneous abortions in women, have been associated with high lead exposure. The developing fetus is at particular risk from maternal lead exposure, with low birth weight and slowed postnatal neurobehavioral development noted. Human studies are inconclusive regarding lead exposure and cancer.

AIR QUALITY IMPACT ANALYSIS

The facility does not meet the definition of a significant change; therefore, air modeling is not required for this construction permit evaluation.

MONITORING OF OPERATIONS

The applicant will maintain records of material usage on a monthly and 12-month rolling average basis that will be used to monitor the emissions.

The applicant will also be monitoring for 45CSR7 compliance.

The applicant will keep filter maintenance records.

PERMIT CHANGES

This is a new construction permit with no previous version.

RECOMMENDATION TO DIRECTOR

The writer recommends that construction permit R13-2873 be granted to Mine Power Systems, Beaver Facility 081-00246 located in Raleigh County. Based on the information reviewed in the application and observed during the site visit, the applicant meets or will meet all applicable state and federal regulations when they comply with the terms of the construction permit R13-2873.

Laura Jennings
Permit Engineer

Date